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# THE GREENING OF AMERICAN ENERGY POLICY

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The recent resurgence of environmentalism, reflected in widespread concern about such problems as garbage strewn beaches, acid rain, and the preservation of natural resources, indicates a consensus among the populace that the environment can no longer be taken for granted. These considerations have been the impetus for a spate of legislative activity.

This Article explores this recent resurgence of environmentalism and its potential effect on electric utilities in the coming decade. The first section presents a brief history of United States energy policy and the patterns of energy generation and consumption. Next, the Article discusses the environmentally-driven development of conservation and emissions reduction strategies, many of which are under consideration in pending congressional legislation and/or have been enacted at the state level. In conclusion, the Article attempts to suggest the nature of the next decade's energy policy.

## I. PAST ENERGY USE

In the boom years of economic expansion following World War II, America's demand for electric power grew at a steady yearly rate of seven percent.<sup>1</sup> Total energy demand also increased steadily, but at a lesser rate of four percent per year.<sup>2</sup> As electric utilities built larger and more efficient plants, the price of electricity dropped.<sup>3</sup> Thus, in the early 1970s it was a truism in the utility

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<sup>1</sup> U.S. DEP'T OF ENERGY, UNITED STATES ENERGY POLICY: 1980-1988 67 (1988) [hereinafter ENERGY POLICY].

<sup>2</sup> *Id.* at 39. From the years 1960-1973, there was a steady four percent increase in the total demand for energy. *Id.*

<sup>3</sup> *Id.* at 67.

industry that energy demand paralleled the gross national product ("GNP").<sup>4</sup> Utilities assumed that a growing economy, bolstered by cheap electricity and oil, would have even greater energy needs.<sup>5</sup> The 1973 OPEC oil embargo and the dramatic increase in the price of petroleum products, however, revealed, for the first time, the degree of our nation's reliance on foreign sources of energy for the maintenance of our basic standard of living. The response was a national resolve to achieve "energy independence" and the creation of a national energy policy intended to further this goal.<sup>6</sup>

The public and private sectors mobilized to form an energy policy to meet the short-term deficiency and long-term needs of the nation. The federal government created a host of economic incentives. Direct subsidies and tax credits were instituted for energy exploration and the development of alternate energy sources (*e.g.*, outer continental shelf drilling and wind power installations), conservation purchases (*e.g.*, home insulation), and research for alternative sources (*e.g.*, solar and gasohol). Other actions were more prescriptive, such as federally mandated fuel efficiency standards for motor vehicles.<sup>7</sup> In 1977, the Department of Energy was formed to oversee and regulate these various programs. Commercial businesses invested in the development of solar, geothermal, and wind power generators and synthetic fuels. The preamble of the National Energy Conservation Policy Act of 1978<sup>8</sup> captured well the hurried and beleaguered mood of the nation:

[U]nless effective measures are promptly taken by the Federal Government and other users of energy to reduce the rate of growth of demand for energy, the United States will become in-

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<sup>4</sup> *Id.* at 39.

<sup>5</sup> *Id.* at 67.

<sup>6</sup> See J. YAGER & E. STEINBERG, *ENERGY AND U.S. FOREIGN POLICY* 390 (1974). Strategic concerns ranged from vulnerability to economic blackmail and price manipulation, to the future availability of nonrenewable resources and the military consequences of protecting interests in the Middle East. See generally EXECUTIVE OFFICE OF THE PRESIDENT, *ENERGY POLICY & PLANNING, THE NATIONAL ENERGY PLAN* ix-xvi (1977) (identifying and discussing the national concerns resulting from OPEC embargo).

<sup>7</sup> The required miles per gallon ("mpg") doubled from 1975 to 1985. See *National Energy Policy Act of 1989 (Energy Efficiency and Renewable Energy): Hearings on S. 324 Before the Senate Comm. on Energy and Natural Resources*, 101st Cong., 1st Sess. 164, 166 (1989) [hereinafter *S. 324 Hearings*] (testimony of Ralph Cavanagh, Natural Resources Defense Council); see also Cavanagh, *Least-Cost Planning Imperatives for Electric Utilities and their Regulators*, 10 HARV. ENVTL. L. REV. 299, 327-28 (1986) (describing some states' prescriptive measures).

<sup>8</sup> 42 U.S.C. § 8201(a)(2) (1978) (amended 1986).

creasingly dependent on the world oil market, increasingly vulnerable to interruptions of foreign oil supplies, and unable to provide the energy to meet future needs.<sup>9</sup>

The growth in electricity consumption slowed in the late 1970s to 3.5% per year.<sup>10</sup> More important, overall energy use was flat. Even with increasing electricity demand, the total United States energy consumption in 1987 was roughly the same as in 1973: no net change over fourteen years despite a forty percent increase in the GNP, twenty million more homes, and fifty million more vehicles.<sup>11</sup>

Closer examination of the energy savings from 1973 to 1987 reveals that petroleum and natural gas were the main energy sources conserved. Indeed, from 1974 to 1987, electric utilities actually *increased* their use of coal and nuclear power<sup>12</sup> by more than seventy-five percent.<sup>13</sup> To the extent that the environmental

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\* *Id.* The amended version of this act still reflects the continued interest in self-reliance. It states that the "effective measures must continue to be taken by the Federal Government and other users and suppliers of energy to control the rate of growth of demand for energy and the efficiency of its use." *Id.* (Supp. V 1987).

<sup>10</sup> See ENERGY POLICY, *supra* note 1, at 67.

<sup>11</sup> *Id.* at 39. Economists estimate that as a result of rising oil prices, western industrialized nations lost economic growth of \$1.2 trillion as inflation tripled and unemployment doubled. *Id.* at 6.

<sup>12</sup> The development of nuclear power has had a history driven by unique factors little related to the oil embargo and the subsequent national efforts at directing energy policy. The 1979 accident at Three Mile Island in Pennsylvania brought to a halt an industry already deeply troubled by enormous cost overruns and well-organized public opposition. The Chernobyl accident in the Soviet Union aborted any short-term prospect of resurgence. Because of the long lead time for construction and licensing of a nuclear plant, typically a dozen or more years, large plants ordered in the early 1970s continued to come on line, increasing the nuclear share of electric generating capacity. However, no new nuclear plants have been ordered since 1974 and over 100 have been cancelled since 1972. The last two, the Shoreham plant in New York and the Seabrook plant in New Hampshire, are virtually completed, but their proposed operation is the focus of intense public and political debate. See, e.g., *Nuclear Power Plant Design Standardization: Hearings on H.R. 2488 Before the House Subcomm. on Energy Conservation and Power of the Comm. on Energy and Commerce*, 99th Cong., 1st Sess. 119, 120-23 (1985) (testimony of Ellyn R. Weiss). For a good discussion of the allocation of plant cancellation costs, see Rodgers & Gray, *State Commission Treatment of Nuclear Plant Cancellation Costs*, 13 *HOFSTRA L. REV.* 443, 444-67 (1985).

<sup>13</sup> See *S. 324 Hearings*, *supra* note 7, at 169 (testimony of Ralph Cavanagh, Natural Resources Defense Council). A comparison between 1975 and 1985 percentages of fuel consumption for electric energy production illustrates the relative growth of coal and nuclear power. Coal use grew from 44.6% in 1975 to 57.2% in 1985, and nuclear power increased from 9.0% to 15.5%, as nuclear plants ordered a decade before were becoming operational. From 1975 to 1985, petroleum use for electric generation *decreased* from 15.1% to 4.1%; natural gas decreased from 15.6% to 11.8%; and hydroelectric power from 15.6% to 11.4%. See BUREAU OF THE CENSUS, STATISTICAL ABSTRACT OF THE UNITED STATES 554 (1987).

problems associated with coal combustion and its high sulfur dioxide and nitrogen oxide emissions were considered, they were overridden by concern that dependence on imported oil threatened national security. In the decade since the second oil shortage in 1978, alternative energy sources have not fulfilled their initial promise. Synthetic fuels have never been widely used, and while the initial federal investment in solar and wind power did spur impressive technological developments, these power sources have been unable to compete on a commercial scale in an era of low oil prices.<sup>14</sup>

The atrophy of renewable energy development may be attributed to the low and stable oil prices throughout the 1980s,<sup>15</sup> the government's essentially laissez-faire policy in the Reagan years and concerted efforts to reduce conservation expenditures. During a period when its budget increased by fifty percent, the Department of Energy cut funding for its energy efficiency programs by fifty percent and renewable energy resource programs by seventy-five percent.<sup>16</sup> In fiscal year 1979, Congress authorized \$1.2 billion for conservation research and development. This year, one quarter of that amount, \$258.6 million, was authorized. In 1980, Congress authorized over \$718 million for solar and renewable energy research and development; this year Congress provided only one-tenth that amount.

In spite of these cutbacks, one piece of legislation from the

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<sup>14</sup> As the Congressional Office of Technology Assessment recently concluded: [increased use of renewable] technologies is currently limited by low cost of conventional fossil fuels (example: solar heating) or availability of resources, (example: hydropower). Some renewable technologies, such as photovoltaics, geothermal and wind, have commercially available designs but these designs do not currently compete well with traditional technologies, especially for large energy applications. . . . [T]he last several years of low and relatively stable energy prices, coupled with declining federal and private support for research, development, and demonstration, and changes in the tax treatment of renewable energy and conservation investments, has severely diminished the sense of urgency about energy efficiency and renewable energy. . . . The result has been an eroding industry infrastructure for both research and commercial development.

S. 324 Hearings, *supra* note 7, at 55-57 (testimony of Dr. John Gibbons, Director, Office of Technology Assessment).

<sup>15</sup> See *Technologies for Remediating Global Warming: Hearings Before the Subcomm. on Natural Resources, Agriculture Research and Environment of the House Comm. on Science, Space and Technology*, 100th Cong., 2nd Sess. 59, 68 (1988) [hereinafter *Global Warming Hearings*] (testimony of Dr. Peter Blair, Office of Technology Assessment). In 1988, the real price of gasoline was 50% less than it had been in 1981. See *ENERGY POLICY*, *supra* note 1, at 3.

<sup>16</sup> See *Global Warming Hearings*, *supra* note 15, at 6 (statement of Representative Claudine Schneider).

Carter era has retained its vitality: the Public Utilities and Regulatory Policies Act of 1978 ("PURPA").<sup>17</sup> This law requires that major electric utilities in need of power solicit bids from independent energy producers at an "avoided cost rate," *i.e.*, the cost to the utility of producing the power itself.<sup>18</sup> The goals of the legislation were to encourage the development of alternative energy sources, termed "qualifying facilities," and to provide small-scale competition to utilities. PURPA successfully stimulated small-scale power producers such that the capacity of qualifying facilities increased a hundred-fold in a decade.<sup>19</sup> Two-thirds of this new power came from coal-fired cogeneration plants.<sup>20</sup>

Today, our energy policy is once again being challenged. After fifteen years of flat energy growth, energy consumption has increased since the 1987 drop in the price of oil.<sup>21</sup> Since the early 1970s, coal has consistently provided the bulk of energy production. During the same period, as the use of nuclear power has increased,<sup>22</sup> oil, natural gas, and hydroelectric power have decreased their relative contributions to the nation's electricity production. Presently, coal provides approximately fifty-seven percent of our electricity, nuclear power accounts for twenty percent, oil and gas contribute fourteen percent, and renewable energy nine percent.<sup>23</sup>

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<sup>17</sup> See 16 U.S.C. § 2601 (1982).

<sup>18</sup> See ENERGY POLICY, *supra* note 1, at 71.

<sup>19</sup> PURPA capacity filed with the Federal Energy Regulation Commission through 1988 was 64 gigawatts. See S. 324 Hearings, *supra* note 7, at 393. The qualifying facilities were cogeneration (44,269 megawatts), biomass (9,151 megawatts), hydroelectric (3,290 megawatts), fossil waste (3,175 megawatts), and, to a lesser extent, wind, geothermal, and solar. *Id.* This would have provided about eight percent of the nation's installed electric generating capacity in 1987. See ENERGY INFORMATION ADMINISTRATION, INVENTORY OF POWER PLANTS IN THE UNITED STATES: 1987 Table 4 (1987).

<sup>20</sup> Cogeneration plants take advantage of the steam produced to drive the generator's turbine by reusing it and/or selling it to steam customers. See generally ENERGY TECHNOLOGY REVIEW No. 29, COGENERATION OF STEAM AND ELECTRIC POWER 95-101 (R. Noves ed. 1978) (discussing cogeneration and its feasibility).

<sup>21</sup> See S. 324 Hearings, *supra* note 7, at 169 (testimony of Ralph Cavanagh, Natural Resources Defense Council). During the past two years, energy use has risen about eight percent, in tandem with the GNP. *Id.* at 495, 558 (statement of Howard Geller, American Council for an Energy-Efficient Economy) (Appendix II). Oil imports are the largest U.S. import item, contributing to one-third of the trade deficit. See W. CHANDLER, ENERGY EFFICIENCY: A NEW AGENDA 13 (1988).

<sup>22</sup> See *supra* note 12 and accompanying text.

<sup>23</sup> See ENERGY POLICY, *supra* note 1, at xvi-xvii, xix.

### A. *Environmental Ascendancy*

Concerted federal efforts directed toward energy independence lasted only a brief time. Some were probably misguided; for example, the enormous investment in the abandoned Great Plains synthetic fuel plant.<sup>24</sup> Other actions fell victim to the drop in oil prices,<sup>25</sup> public disinterest, and an administration ideologically opposed to any action redolent of central government planning or interference with free markets. Other efforts, such as streamlining nuclear power plant licensing through a federal override of state authority,<sup>26</sup> expired for general lack of interest as far fewer large new power plants were needed than the Department of Energy originally assumed.<sup>27</sup>

For the first time in nearly a decade, however, energy policy has recently resumed a place on the federal agenda. The new driving force is environmentalism. As the oil shocks captured the public's attention over energy use, so too have recent events focused the public's concern on the environment. Five of the century's hottest summers have occurred this decade.<sup>28</sup> The summer of 1988 parched the country and produced records in high temperatures, drought, forest fires, and ground-level ozone.<sup>29</sup> Upper atmospheric measurements confirmed the increasing concentrations of carbon dioxide, the chief contributor to the greenhouse effect.<sup>30</sup> In addition, acid deposition and acid rain continued to degrade lakes and

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<sup>24</sup> See *U.S. Synthetic Fuel Corporation Shuts Down*, N.Y. Times, Apr. 19, 1986, § 1, at 46, col. 4; Crawford, *Industry Abandons Synfuels Project*, 229 SCIENCE, Aug. 16, 1985, at 633, col. 1.

<sup>25</sup> In March 1989, the price of gasoline was lower in real terms than it had been in 1972, the year before the oil embargo. See *S. 324 Hearings*, *supra* note 7, at 75 (testimony of Dr. John Gibbons, Director, Office of Technology Assessment).

<sup>26</sup> This practice was known as fast-track siting. See Comment, *Energy Facility Siting: Recent Models of Reform*, 56 WASH. L. REV. 467, 471-73 (1981).

<sup>27</sup> See *ENERGY POLICY*, *supra* note 1, at 67.

<sup>28</sup> Boston Globe, Jan. 23, 1989, at 31, col. 1. The summer of 1988 was the hottest summer in a century in Moscow and in Delhi, India. See Taubman, *A Lunch, a Walk and a Beach, Maybe*, N.Y. Times, July 30, 1988, at 4, col. 4.

<sup>29</sup> See *Greenhouse Effect and Global Climate Change: Hearings Before Senate Comm. on Energy and Natural Resources*, 100th Cong., 1st Sess. 5 (1988) [hereinafter *Greenhouse Effect Hearings*] (Statement of Senator Timothy E. Wirth). Over 90 regions throughout the country had ground-level ozone, or smog, in violation of Clean Air Act standards. *Number of Areas Violating Ozone Standard Will Increase*, Env't Rep. (BNA) No. 19, at 2301 (Feb. 24, 1989).

<sup>30</sup> The atmospheric concentration of carbon dioxide is annually increasing at 1.5 parts per million. See McKibben, *The Exxon Valdez as a Metaphor*, N.Y. Times, Apr. 7, 1989, at A31, col. 2.

forests in the Northeast and Canada.

The summer of 1988 also witnessed records for electricity demand in the Northeast, Mid-Atlantic, Midwest, and West Coast.<sup>31</sup> Regardless of whether the severity of the summer of 1988 was an aberration, many utilities face the 1990s with a projected demand growth that exceeds current capacity.<sup>32</sup> Moreover, selecting an energy source that can match capacity with demand has become increasingly difficult and complex, mandating consideration of a host of factors beyond the traditional economic concerns. The cost of nuclear power, its long lead times and, perhaps, above all, the public opposition which it engenders, make that choice exceedingly unlikely for now. While development of non-polluting renewable energy sources, such as solar and geothermal energy, holds promise, these sources are not yet competitive on a large scale. The more common sources of energy, including coal, oil, and natural gas, are readily available in the short term, but they necessarily increase the volume of pollution in the air when combusted.<sup>33</sup>

In addition to the problem of choosing the correct energy source for today's consumption, energy planners also must address environmental concerns so that projects currently being conceptualized and developed will be environmentally acceptable to future generations.

Environmentalism is now an undeniably powerful political force in America, and a number of pending legislative initiatives

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<sup>31</sup> ENERGY POLICY, *supra* note 1, at 69-70.

<sup>32</sup> Despite the fact that overall energy consumption in 1987 was at approximately the same level as in 1973, electricity demand did grow during the intervening period, and projections of electricity consumption into the future show continued growth. There is, however, a wide range of demand growth projections. The United States Council for Energy Awareness (USCEA), a pro-nuclear energy lobby, predicts growth in electricity demand of four to five percent per year. See Stanfield, *Bypassing Blackouts*, NAT'L J., Oct. 15, 1988, at 2601. The National Energy Regulatory Commission, the Department of Energy's Energy Information Administration, and the Edison Electric Institute, an investor-owned utility lobby, forecast more modest demand increases of 2 to 2.5% per year. *Id.* The American Council for an Energy Efficient Economy has forecast a 1 to 1.5% growth in demand from 1988 to 1995. See S. 324 Hearings, *supra* note 7, at 571 (testimony of Howard Geller, American Council for an Energy-Efficient Economy). Finally, the World Resources Institute forecasts no growth in demand if aggressive conservation policies are pursued. See Shepard, *The Politics of Climate*, ELECTRIC POWER RES. INST. J., June 1988, at 5. Since 1982 the load growth has been 3.2% per year. See Stanfield, *supra*, at 2601.

Even if conservation and management are pursued more aggressively than in the past, given the age of many generating plants, new capacity additions appear inevitable in the near future.

<sup>33</sup> See Smith & Bluestone, *The Global Greenhouse Finally Has Leaders Sweating*, Bus. Wk., Aug. 1, 1988, at 74.



have linked energy policy with environmental policy to a greater extent than ever before.<sup>34</sup> This Article next explores the renewed national commitment to environmental protection and its effects on the electric utility industry. The environmental issues at stake range from regulating carbon dioxide emissions to transforming utilities into conservation vendors.

## II. ENVIRONMENTAL PROTECTION

Protecting the environment from the effect of electricity generation requires, at a minimum, emitting fewer pollutants into the air. Current legislative initiatives rely on two fundamental approaches to reduce emissions: using less fuel, and cleaning up fuel combustion. These two approaches are customarily referred to as conservation and emissions reductions.

### A. Conservation

Clearly, more energy efficient home appliances and insulation will reduce the energy needed to produce the desired effect. This type of conservation, called "end-use energy efficiency," reduces overall electricity demand. Using more modern, energy-efficient appliances is thus an attractive alternative to increasing the overall electric generating capacity available to older, less efficient models.<sup>35</sup> Historically, however, utilities have been hesitant to choose load-dampening techniques (demand-side management) over electricity generation (supply-side resources) in their energy supply strategies. The customary practice has been to build more powerful utility plants that can meet the growing demand rather than to venture into the unfamiliar area of energy conservation.

Least-cost planning is an increasingly popular regulatory strategy which was conceived to generate competition between demand and supply-side resources. Least-cost planning views energy supply from the perspective of the total cost of providing an energy service. In delivering the same net effect, a kilowatt-hour

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<sup>34</sup> Environmental concerns have, of course, already played a role in energy policy. For example, from 1975 to 1985, utilities spent \$60 billion to reduce sulfur dioxide emissions to meet standards related to the Clean Air Act of 1970. See *ENERGY POLICY*, *supra* note 1, at 80. Even so, the new concerns over global climatic change and acid rain control augur more far-reaching regulation for coal burning.

<sup>35</sup> Since 1972, significant improvements in efficiency have been made. Refrigerators, for instance, are 80% more efficient than in 1972, freezers 60%, and clothes washers 50%. See *ENERGY POLICY*, *supra* note 1, at 49.

saved by efficiency is indistinguishable from a kilowatt-hour delivered to consumers. Under least-cost planning, the utility seeks to identify the next resource it will invest in to meet demand by evaluating demand-side resources against new energy supply options.<sup>36</sup> This process of evaluation must include environmental concerns as well as construction, fuel, operation, and maintenance costs. Proponents of this strategy argue that when all societal costs are factored in, efficiency improvements cost, on average, less than half what it would cost to generate new electricity through coal.<sup>37</sup>

The Pacific Northwest utilities pioneered this concept of least-cost planning, and regulatory commissions in forty-three states now require or are considering the use of least-cost planning in utility decisions.<sup>38</sup> From 1984 to 1986, for example, three California utilities spent almost one billion dollars on efficiency improvements for customers in the residential, commercial, and industrial sectors.<sup>39</sup> By offering rebate incentives for the purchase of new appliances, the Austin, Texas municipal utility as well as the Northern States Power Company and Southern California Edison Company reduced their electricity use and peak demand by 0.4 to 1.4% annually. The rate of electricity load growth dropped by twenty to forty percent.<sup>40</sup> In addition, the Bonneville Power Administration,

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<sup>36</sup> A representative of the Bonneville Power Administration described the process as follows:

[The] first step is to put all power resources, and that includes nuclear plants, coal plants, hydro facilities, cogeneration, as well as conservation, on comparable footing in terms of the amount that is available at a certain price, taking into account such things as lead time, environmental impacts and other features. The second step is to figure out how much power you need. The third step is to figure out which stack or mix of resources most cost effectively meets those future needs.

*S. 324 Hearings*, *supra* note 7, at 324 (testimony of Sue Hickey, Bonneville Power Assistant Administrator).

<sup>37</sup> *Id.* at 185 (testimony of Ralph Cavanagh, Natural Resources Defense Council, quoting Tom Trulove, Chairman of the Northwest Power Planning Council). The *IRT Supplement*, a demand-side newsletter, compared investing in efficiency versus nuclear power to combat global warming, and concluded that "nuclear power is a relatively slow and ineffective response to the Greenhouse Effect whereas electricity efficiency is the opposite: relatively quick and effective." Hassol, *Global Warming: Policy Options*, *IRT Supp.*, July 1980, at 6. The report went on to conclude that improving electricity efficiency is approximately seven times more effective in abating carbon dioxide than nuclear power. *See id.*

<sup>38</sup> ELECTRIC POWER RESEARCH INSTITUTE, *STATUS OF LEAST-COST PLANNING IN THE UNITED STATES* 1 (1988). The Pacific Northwest Electric Power Planning and Conservation Act of 1980 mandates least-cost planning for utilities. *See* 16 U.S.C. § 839 (1982).

<sup>39</sup> *See S. 324 Hearings*, *supra* note 7, at 166 (testimony of Ralph Cavanagh, Natural Resources Defense Council).

<sup>40</sup> *See* W. CHANDLER, *supra* note 21, at 37. The American Council for an Energy-Effi-

which provides electricity to Washington, Oregon, Idaho, and western Montana, spent over \$750 million on conservation savings from 1980 to 1988.<sup>41</sup> Through its efforts in least-cost planning, the Bonneville Power Administration has conserved 220 megawatts of electricity through 1988.<sup>42</sup> A large proportion of the saved megawatts is attributable to Bonneville's weatherization of over 200,000 homes in the Northwest.<sup>43</sup>

Another method of analysis gaining popularity in utility planning is the measurement of "energy intensity." Expressed in units of kilojoules per dollar, energy intensity expresses the rate of energy used per dollar of the GNP. Beyond gauging energy efficiency, this measure is also an indicator of business competitiveness, *i.e.*, Japan's energy intensity is two and a half times better than that of the United States.<sup>44</sup> Producing cleaner fuel will not appreciably improve energy intensity; this can only be achieved through greater efficiency and conservation, options which are fostered by least-cost planning.

Nonetheless, least-cost planning as an energy conservation device is inhibited in the United States due to the structure of the ratemaking system. As the National Association of Regulatory Utility Commissioners ("NARUC") concluded: "Under traditional ratemaking systems, 'profit motive generally encourages utilities to invest in supply-side resources even when demand-side alternatives are clearly identified . . . as being the least-cost resource.' Reforms are needed 'to make the least-cost plan a utility's most profitable resource plan.'"<sup>45</sup>

Utilities are typically publicly-held corporations closely controlled by regulatory bodies. Periodically, the utility submits a rate request to the utility commission. In simplified terms, the electricity rate is determined by dividing the projected revenue requirements, such as overhead, amortized construction costs, and return on equity, by the forecast of energy sales. The resulting quotient,

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cient Economy is a strong supporter of least cost planning.

<sup>41</sup> See *S. 324 Hearings*, *supra* note 7, at 324 (testimony of Sue Hickey, Bonneville Power Assistant Administrator).

<sup>42</sup> *Id.*

<sup>43</sup> *Id.* at 325.

<sup>44</sup> In 1986, the United States used 10% of its GNP to pay for fuel costs while Japan used four percent of its GNP. See Smith & Bluestone, *supra* note 33, at 74.

<sup>45</sup> See *S. 324 Hearings*, *supra* note 7, at 178-79. (quoting Statement of Position of the NARUC Energy Conservation Committee on Least-Cost Planning Profitability, July 26, 1983).

cents per kilowatt-hour, is the rate which can be charged consumers for the period covered by the rate request. Profits can be increased only by exceeding projected energy sales or by reducing the cost of operations.

Conservation does have drawbacks, however; it erodes profits because it actually *reduces* energy demand by requiring fewer kilowatts of electricity to be sold. Moreover, current ratemaking formulas allow utilities to earn a return on capital investments.<sup>46</sup> Unlike power plants, utilities' efficiency investments, such as appliance rebates and home energy audits, are generally not treated as capital investments, but must be expensed. Thus, while these costs are recouped, they do not generate any profit.<sup>47</sup> For these reasons, the economic incentives in ratemaking can encourage investment in supply-side rather than demand-side resources.<sup>48</sup> This was exemplified in the recent report of the NARUC to Congress, which concluded that forty-nine out of fifty states penalize utilities' energy-efficiency efforts.<sup>49</sup>

Beyond the inherent disincentives in ratemaking procedures, least-cost planning must also battle skepticism by industry officials.<sup>50</sup> The president of the largest utility in Virginia, for example, agrees that greater investment in energy efficiency will reduce demand, but disagrees "with those people who say we ought to pay (customers) something extra to get them to do that. Somebody

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<sup>46</sup> See *S. 324 Hearings*, *supra* note 7, at 356, 425 (testimony of Stephen Wiel, Commissioner, Nevada Public Service Commission). Until the 1970s, this policy was consistent with the goal of increasing the capacity and distribution of electricity. *Id.*

<sup>47</sup> These costs, because they are expensed, also produced higher utility bills in that year. Capital investments, amortized over a period of years, have a less dramatic effect on rates.

<sup>48</sup> There are competing economic considerations, however. New power plants are exceedingly expensive to construct and take many years to complete. At the end of this process, the inclusion of all of these costs in the rate base is subject to challenge on the grounds that the costs were imprudently or unnecessarily incurred. See, e.g., *Duquesne Light Co. v. Barasch*, 109 S. Ct. 609, 616 (1989). Utilities do invest resources in conservation. According to the Edison Electric Institute, an organization of investor-owned utilities, utilities now spend over one billion dollars a year on programs designed to increase end-use efficiency. See *S. 324 Hearings*, *supra* note 7, at 412 (testimony of William McCollam, Jr., President, Edison Electric Institute). Having increased in number from 134 in 1977 to 1,300 today, these programs range from informational materials and energy audits to rebates and financing of efficiency technologies. *Id.* at 411.

<sup>49</sup> See *S. 324 Hearings*, *supra* note 7, at 349, 426 (testimony of Stephen Wiel and Senator Wirth).

<sup>50</sup> *Id.* at 404 (testimony of William McCollam Jr., President, Edison Electric Institute). The Edison Electric Institute maintains that demand-side conservation should be reflected in lowered load forecasts rather than competing directly with supply sources. *Id.*

who puts in an energy-efficient investment sees his electric bill go down."<sup>51</sup> This criticism, however, disregards the differing investment horizons of consumers and utilities. Whereas consumers expect a short payback period on efficiency investments, utilities routinely amortize investments over fifteen to twenty years. If the burden to make conservation investments with long payback periods falls solely on consumers, then these socially advantageous investments will not be made because consumers will be unable or unwilling to shoulder such long-term burdens.

Presently, utility commissions throughout the nation are implementing innovative strategies to remove the disincentives to choosing efficiency improvements over capacity additions. Utilities in Maine and Massachusetts presently solicit bids for electricity savings.<sup>52</sup> Likewise, California adjusts utility revenues resulting from unexpected changes in sales volumes.<sup>53</sup> This removes the disincentive of lost sales from demand-side programs. Moreover, ten states presently allow a margin of profit on demand-side investments instead of treating them as operating expenses.<sup>54</sup> Other states, such as Washington and Wisconsin, grant a higher rate of return for demand-side investments than supply-side investments.<sup>55</sup> Similarly, Maine is considering increasing utilities' profit margin based on reductions in customers' energy bills.<sup>56</sup> In addition, utilities in California and Massachusetts have been penalized in ratemaking for failing adequately to pursue efficiency alternatives.<sup>57</sup>

Presently before Congress are two bills, motivated by environmental concerns, which would mandate least-cost planning nationwide in energy decisions: Senator Wirth's bill, the National Energy

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<sup>51</sup> Stanfield, *supra* note 32, at 2603.

<sup>52</sup> See W. CHANDLER, *supra* note 21, at 39. Central Maine Power (CMP), for instance, contracted with a company to provide weatherization and insulation to homeowners. See S. 324 Hearings, *supra* note 7, at 395-96 (testimony of Stephen Wiel, NARUC). Upon installation, CMP pays one-half of the present value of each home's projected future energy savings. *Id.* The final payment is adjusted based upon monitoring the home's actual energy use for a year. *Id.*

<sup>53</sup> See S. 324 Hearings, *supra* note 7, at 396 (testimony of Stephen Wiel, NARUC).

<sup>54</sup> *Id.* at 466.

<sup>55</sup> *Id.*

<sup>56</sup> *Id.* at 468-69.

<sup>57</sup> W. CHANDLER, *supra* note 21, at 38. In 1979, Pacific Gas & Electric was penalized for failing to make adequate progress in cogeneration facilities. In 1986, Boston Edison Company was given a reduced rate of return because of its poor conservation efforts.

Policy Act of 1989,<sup>58</sup> and Representative Schneider's bill, the Global Warming Prevention Act of 1989.<sup>59</sup> Calling for a complete reevaluation of energy supply through the least-cost perspective, Senator Wirth's legislation requires the Secretary of Energy and the Administrator of the Environmental Protection Agency ("EPA") to submit a "least-cost national energy plan" to Congress within eighteen months.<sup>60</sup> The plan must assign priorities among energy sources according to cost-effectiveness and their impact on the global climate.<sup>61</sup> In producing a range of energy demand forecasts, the plan must undertake a comprehensive inventory of available resources and their cost.<sup>62</sup> Additionally, the Secretary of Energy must submit to Congress every three years a report on strategies to improve the nation's energy intensity by two to four percent through the year 2005.<sup>63</sup>

To encourage least-cost investment, the Wirth bill would amend PURPA to require ratemaking so that "the implementation of least-cost supply measures permits the utility to realize higher earnings than would be realized from the implementation of other supply measures."<sup>64</sup>

The Schneider bill contains a similar national least-cost energy plan. This bill would further amend PURPA in order to facilitate the development of a competitive market for qualifying cogeneration facilities, small power production facilities, and efficiency entities<sup>65</sup> by encouraging state regulatory commissions to al-

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<sup>58</sup> S. 324, 101st Cong., 1st Sess., 135 CONG. REC. S1034-61 (daily ed. Feb. 2, 1989) [hereinafter NENPA].

<sup>59</sup> H.R. 1078, 101st Cong., 1st Sess., 135 CONG. REC. H370, E467-70 (daily ed. Feb. 22, 1989) [hereinafter GLOWPA]. Wirth is a Democrat from Colorado. Schneider is a Republican from Rhode Island. The bills address subjects ranging from energy efficiency and solar hydrogen fuels to rainforest protection and moderating world population growth.

<sup>60</sup> See NENPA, *supra* note 58, tit. I(a). The legislation provides that, "in the near term, increasing the Nation's energy efficiency can make the largest and least costly contribution to reducing carbon dioxide and trace gas production and reliance on imported oil." *Id.* at 2(a)(6). The term "energy resources" is broadly defined as "those sources of additional energy supply involving either the production of additional energy or additional improvements in the efficiency of energy processing and end use." *Id.* tit. I(a)(1).

<sup>61</sup> See *id.* tit. I(b)(1).

<sup>62</sup> See *id.* tit. I(b)(3).

<sup>63</sup> See *id.* tit. III, subtit. A, § 301(b).

<sup>64</sup> *Id.* tit. III, subtit. B, § 114(b). The term "implementation of least cost supply measures" is defined as conservation and other means of demand reduction which provide service to customers at the "lowest total costs to society, such costs to include costs incurred by the utility and its customers, and environmental costs." *Id.* (emphasis added). This analysis thus incorporates externalities of energy production.

<sup>65</sup> *Id.* tit. III, subtit. B, § 313(b). Offers must be "under such terms as the commission

low utilities to realize higher earnings on least-cost supply measures than on alternative energy sources.<sup>66</sup> The Schneider bill also calls for energy productivity improvements of at least three percent by the year 2010.<sup>67</sup>

### B. Emissions Reductions

Pending legislation has targeted two emissions of particular concern to utilities: carbon dioxide and sulfur dioxide.

#### 1. Carbon Dioxide

Although carbon dioxide is a completely unregulated industrial emission, it is the single most significant contributor to the "greenhouse effect," the warming of the global climate.<sup>68</sup> The United States emits the most carbon dioxide of any nation, and roughly 7.5% of global carbon dioxide emissions are from United States utilities.<sup>69</sup> While just a few years ago it might have seemed

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may prescribe and shall include provisions concerning verification of the achievement of qualifying conservation." *Id.*

<sup>66</sup> See GLOWPA, *supra* note 59, § 2(b)(2)(B).

<sup>67</sup> See *id.* § 2(b)(2)(A).

<sup>68</sup> See S. 324 Hearings, *supra* note 7, at 209 (testimony of Dr. Thomas Bath, Solar Energy Research Institute) (other significant greenhouse gases are methane, chlorofluorocarbons, and nitrous oxide). While the rate of greenhouse warming is uncertain, scientists are in agreement that atmospheric carbon dioxide levels have increased from 280 parts per million ("ppm") at the end of the nineteenth century to 350 ppm today. See Lemonick, *Planet of the Year*, TIME, Jan. 2, 1989, at 36. From 1950 to 1980, annual carbon emissions grew from 1.6 billion tons to 5.1 billion tons. See Shepard, *The Politics of Climate*, ELECTRIC POWER RES. INST. J. 7 (1988). The driving forces behind this increase are fossil fuel combustion and deforestation. *Id.* Greenhouse warming models predict global mean temperature rising at 0.6 degrees Fahrenheit per decade and sea level rising 2.5 inches per decade. See *Greenhouse Effect and Global Climate Change. Part Two: Hearings Before the Senate Comm. on Energy and Natural Resources*, 100th Cong., 1st Sess. 80-82 (1988) (testimony of Dr. Michael Oppenheimer, Senior Scientist, Environmental Defense Fund). Scientists testifying before Congress have argued that greenhouse warming over the next century will move climatic zones poleward, shift the arable zones, cause large and continuous dislocations of natural vegetation, and spur the flooding of low-lying areas. *Id.* at 96-97 (testimony of G. M. Woodwell, Director, Woods Hole Research Center).

<sup>69</sup> See *The Global Environmental Protection Act of 1988: Joint Hearings on S. 2666 Before the Subcomm. on Hazardous Wastes and Toxic Substances and the Subcomm. on Environmental Protection of the Senate Comm. on Environmental and Public Works*, 100th Cong., 2nd Sess. 251 (1988) (testimony of James Tacheney, Northern States Power Company). Of carbon dioxide emissions in the United States, electric power generation accounts for 28%, transportation 30%, and other industrial uses 24%. *Id.* at 250. In 1987, the United States generated 1.2 billion tons of carbon dioxide emissions, almost 18 times more weight than municipal garbage. *Id.* at 252 (testimony of Dr. Meyer Steinberg, Brookhaven National Laboratory). Worldwide in 1985, coal and solid fuel combustion provided approxi-

anomalous to describe carbon dioxide as a pollutant, growing concern over global warming has altered popular perceptions of this pervasive compound. A total phase-out of fossil fuel combustion would, of course, be the most effective strategy to forestall global warming, but the current commitment worldwide to fossil fuels ensures that such a goal can be approached only gradually. In the short term, the choice of fuel for electricity generation is crucial: coal combustion produces two times more carbon dioxide than does natural gas combustion and one-third more than oil combustion.<sup>70</sup> Thus, "fuel-switching" is an immediately effective policy to slow the greenhouse effect.

In fact, a new conceptual approach being considered is that greenhouse gases should be required to pay their way. This approach begins with the proposition that present energy costs do not currently reflect the externalities of energy production. It is argued that if the price of a kilowatt-hour truly accounted for the consequential costs of acid rain, global warming, domestic protection of foreign oil suppliers and other energy-related expenses, the energy market would send correct signals to utilities and consumers.<sup>71</sup> Only then could rational decision-makers evaluate the full cost of energy supply. As the EPA Office of Policy, Planning, and Evaluation has written, "the most direct means of allowing markets to incorporate the risk of climatic change is to assure that the prices of fossil fuels and other sources of greenhouse gases reflect their social costs."<sup>72</sup> Such approaches attempt to reconcile environmental protection with the philosophy and rhetoric of market economics.

To account for environmental externalities, the EPA, in a draft report to Congress, has suggested a number of regulatory initiatives. These include levying fees on carbon dioxide emissions

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mately 44% of carbon dioxide emissions, liquid petroleum 40% and natural gas 15%. *Id.* at 362 (testimony of Dr. Irving Mintzer, World Wide Resources Institute).

<sup>70</sup> See *id.* at 383 (testimony of Dr. Irving Mintzer, World Wide Resources Institute). The average United States coal plant, operating at 34% efficiency, emits 630 pounds of carbon dioxide per million BTUs. *Id.* at 366. Oil-fired plants at 31% efficiency emit only 435 pounds and gas turbine generators at 35% efficiency emit only 330 pounds of carbon dioxide per million BTUs. *Id.*

<sup>71</sup> See *EPA Draft: Pricing and Regulation of Fuels Could Cut Global Warming*, *ELECTRIC UTIL. WEEK*, Mar. 20, 1989, at 15.

<sup>72</sup> *Id.* While pressure is mounting for regulation of carbon emissions, some scientists have called for restraint, arguing that the greenhouse effect has not been verified as the cause of global warming. See Solow, *Pseudo-Scientific Hot Air*, *N.Y. Times*, Dec. 28, 1988, at A27, col. 1.



(on a per ton basis), requiring large plants to offset their carbon dioxide emissions (e.g., planting trees to capture the equivalent of carbon dioxide released), requiring performance standards in smokestacks (e.g., promulgating emissions rates), and allowing the trading of emissions reduction permits for carbon dioxide.<sup>73</sup> Other advocates have urged adoption of a carbon tax, mandatory fuel-switching, and consideration of carbon dioxide emissions in environmental impact statements.<sup>74</sup>

Both the Wirth and Schneider proposed global warming bills would establish a national goal of reducing carbon dioxide emissions by twenty percent by the year 2000.<sup>75</sup> Neither bill, however, provides prescriptive regulation beyond calling for appropriate state and federal policies consistent with achieving reductions in carbon dioxide emissions.<sup>76</sup> A bill introduced last year in Congress by Senator Stafford of Vermont would have made carbon dioxide a regulated pollutant under the Clean Air Act.<sup>77</sup> Establishing carbon dioxide emissions rates for fossil fired utilities,<sup>78</sup> the bill would also set emission standards for mobile sources<sup>79</sup> and single family dwellings.<sup>80</sup> The legislation would also have amended the National

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<sup>73</sup> See *EPA Cites Growing Scientific Consensus on Possibility of Significant Global Warming*, 19 Env't Rep. (BNA) 2470 (Mar. 17, 1989).

<sup>74</sup> Shepard, *supra* note 32, at 12; see *S. 324 Hearings*, *supra* note 7, at 176.

<sup>75</sup> *S. 324 Hearings*, *supra* note 7, at 176-77. The Natural Resources Defense Council has testified that efficiency improvements alone (e.g., lighting, fuel economy, and appliances) will reduce carbon dioxide emissions from 20 to 26% by the year 2005. *Id.* at 177.

<sup>76</sup> Wirth's bill, for example, calls for the reductions "through a mix of federal and state energy policies that are designed to mitigate the costs and risks, both economic and environmental, associated with meeting national energy needs while reducing the generation of carbon dioxide and trace gases and sustaining economic growth and development." S. 324, 101st Cong., 1st Sess. § 3(a). Both Wirth's and Schneider's bills do state that increasing the nation's energy efficiency is the best and least costly strategy to reduce carbon dioxide emissions. Both bills would also fund clean coal technology development and Wirth's bill would establish a research and development program of disposal technologies for carbon dioxide. See *id.* §§ 2(a)(6), 902(a).

<sup>77</sup> See The Global Environmental Protection Act of 1988, S. 2666, 100th Cong., 2d Sess. (1988). The bill would revise the standards of § 111 in the Clean Air Act. See *id.* tit. I, pt. B, § 116.

<sup>78</sup> See *id.* tit. I, pt. B, § 116(a)(B). The bill set target emission rates of 610 pounds of carbon dioxide per million BTUs by 1990, 435 pounds by the year 2000, and 280 pounds by the year 2010. *Id.*

<sup>79</sup> See *id.* tit. I, pt. B, § 117(a). For mobile source controls, the bill would amend § 202(a)(3)(A)(ii) of the Clean Air Act to require reductions in carbon dioxide emissions from vehicles of 10% by 1990, 25% by 1995, 50% by 2000, and 75% by 2010. *Id.*

<sup>80</sup> See *id.* tit. I, pt. B, § 118(a). The residential controls would require EPA regulations identifying the best available residential control technology for central furnaces, air conditioners, and hot water heaters designed for single-family dwellings. See *id.* Starting in 1992,

Environmental Policy Act of 1969 ("NEPA")<sup>81</sup> to require environmental impact statements for federal actions which may contribute to global climate change.<sup>82</sup>

## 2. Sulfur Dioxide

Coal will play a large part in any energy policy in the near future. In 1988, coal provided fifty-seven percent of the nation's electricity,<sup>83</sup> and the United States has an estimated 480 billion tons of recoverable coal, fifty times the energy equivalent of our oil reserves.<sup>84</sup> Coal mined in the eastern states, however, has a high sulfur content which, when combusted, emits large quantities of sulfur dioxide, the precursor of acid deposition. Already a prime suspect in the demise of Europe's forests, acid deposition has become a major issue of dispute between the United States and Canada. The Clean Air Act<sup>85</sup> presently regulates emissions of sulfur dioxide from major generators.<sup>86</sup> These restrictions will almost surely be tightened as both the Bush Administration and a number of congressional initiatives have called for nationwide reductions at a minimum of ten million tons of sulfur dioxide by the year 2000.

The present methods of reducing sulfur dioxide emissions—flue gas scrubbers, use of low-sulfur coal, and "clean coal" technology—are all problematic. Scrubbers have been criticized by

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the bill would require each new single-family dwelling equipped with a central furnace, air conditioner or hot-water heater to meet or exceed the emissions limitations achieved by the best available residential control technology. *See id.* tit. I, pt. B, § 118 (b). By 1993, replacement units in older dwellings would also be required to meet that standard. *See id.* tit. I, pt. B, § 118 (c).

<sup>81</sup> 42 U.S.C. §§ 4321-4361 (1982 & Supp. V 1987).

<sup>82</sup> *See* S. 2666, 100th Cong., 2d Sess. tit. III, § 303(c) (1988). Such actions would include emissions of carbon dioxide, nitrogen oxides, chlorofluorocarbons, methane, and a number of other chemicals. *Id.*

<sup>83</sup> *See* ENERGY POLICY, *supra* note 1, at 29. Roughly 85% of the nation's coal is used to generate electricity. *Id.* To place this energy consumption in perspective, in 1986 electric power utilities used only 0.63 million barrels of oil per day while transportation fuels consumed 10.98 million barrels (almost 20 times as much). *Id.* at 79.

<sup>84</sup> *Id.*

<sup>85</sup> 42 U.S.C. §§ 7401-7642 (1982 & Supp. V 1987).

<sup>86</sup> *See id.* § 7473 (1982). This section requires that increases in sulfur oxides and particulate matter exceed neither arithmetic means nor three and twenty-four hour maximums. *Id.*; *see e.g.*, 40 C.F.R. § 60.42b (1988) (setting standards of performance for fossil-fuel fired generators discharging sulfur dioxide-bearing gases). Between 15 and 20 million of the 27 million tons of sulfur dioxide annually discharged into the atmosphere come from coal-fired generating plants. *See* Huber, *Electricity and the Environment: In Search of Regulatory Authority*, 100 HARV. L. REV. 1002, 1032 n.125 (1987).

the utilities as expensive, outdated, and in need of enormous amounts of energy.<sup>87</sup> Traditionally, the prospect of wholesale substitution of low-sulfur coal, which would benefit the economy of certain western states, has caused bitter interregional disputes and predictions that the Appalachian coal industry would be devastated. The clean-coal technology program provides matching federal funds for near-commercial projects that use low-sulfur coal products for energy generation.<sup>88</sup> The program has been criticized, however, because less than twenty percent of the funds to date have been used to reduce emissions from existing plants.<sup>89</sup> Regardless of clean-coal technology's promise, future technologies will not reduce today's emissions.<sup>90</sup>

Sulfur dioxide was one of the original pollutants covered by the Clean Air Act of 1970, and while debate over reducing emissions continues, the Act has not been revised since 1977.<sup>91</sup> There

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<sup>87</sup> See Ford, *Energy Policy, the Environment, and Congress*, PUB. UTIL. FORT., June 16, 1989, at 15. Some of the eastern states have argued in favor of scrubbers as a means to sustain high-sulfur coal mining. See S. 324 Hearings, *supra* note 7, at 145 (testimony of Robert Williams, Senior Research Scientist, Princeton University). Scrubbers are able to remove up to 85% of the sulfur emissions from 3.1% sulfur coal. *Id.* Operations costs are between \$350-650 per ton sulfur dioxide removed. *Id.* Capital costs of putting scrubbers on existing plants are between 42 and 83 cents per kilowatt. *Id.*

<sup>88</sup> See *Tight Sulfur Dioxide Limits Before 2000 Would Threaten Clean Coal Program*, GAO Says, 19 Env't Rep. (BNA) 2625 (Apr. 21, 1989). The Bush administration has proposed \$710 million in fiscal year 1990, a 274% increase over 1989 funding of \$190 million. See *Bush Urged to Support Acid Rain Legislation, Reject Funding for Clean Coal*, by Air Groups, 19 Env't Rep. (BNA) 2254 (Feb. 17, 1989).

<sup>89</sup> See 19 Env't Rep. (BNA) 2254 (Feb. 17 1989).

<sup>90</sup> See *Concern Expressed that Clean Coal Program Could Lead to Imposition of Stricter Standards*, 19 Env't Rep. (BNA) 2626 (Apr. 21, 1989). Ironically, some utilities participating in the Department of Energy's clean coal technology program have said that they might drop out if successful completion of their projects would result in their having to meet tougher air pollution control standards. *Id.* This concern stems from an EPA decision in October, 1988, holding that Wisconsin Electric Power Company's proposed additions to its facilities would have to meet standards for new source performance and prevention of significant deterioration (on the ground that life extension investments are a non-routine renewal of the facilities which would substantially increase air emissions). See *Decision on Wisconsin Plant Modification Neither Policy Shift Nor Inequitable*, EPA Says, 19 Env't Rep. (BNA) 1429, 1430 (Nov. 11, 1988). The Department of Energy has requested that the EPA find clean coal technology exempt from these standards, and the Wisconsin Electric Power Company has petitioned the United States Court of Appeals for the Seventh Circuit to review the EPA's determination. See *Concern Expressed That Clean Coal Program Could Lead to Imposition of Stricter Standards*, *supra*, at 2626.

<sup>91</sup> See *Environmental Protection in 1989: Can Bush, Congress Move Legislation on Clean Air, Waste Issues?*, 19 Env't Rep. (BNA) 1882 (Jan. 20, 1989). Indeed, one reason the Clean Air Act has not yet been reauthorized was the protective power exercised by former Senate majority leader, Robert Byrd of West Virginia. *Id.* at 1884. This year's Senate is ripe

are a number of bills before Congress which, coupled with the Bush Administration's recent proposed amendments to the Clean Air Act, will likely lead to new legislation. The possibility of such legislation raises several issues of major concern to utilities regarding the mechanisms for sulfur dioxide emissions reductions and cost allocation. Rather than establish nationwide emissions limits, the Administration's proposal identifies 107 plants for specific emissions reductions. Over half the targeted plants are in Pennsylvania, Ohio, Indiana, Illinois, and Kentucky.<sup>92</sup> Reductions of five million tons in sulfur dioxide would be required by 1995, and another five million by the year 2000.<sup>93</sup> Nitrogen oxides would be reduced by two million tons by the year 2000.<sup>94</sup> The utilities are free to achieve these reductions in whatever manner they wish, including trading emissions reductions within a state.<sup>95</sup>

In contrast to this approach, bills proposed by Senator Kerry and Representative Cooper would allocate sulfur dioxide reductions among states rather than among utilities.<sup>96</sup> This strategy

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for reorganization. *Id.* Byrd has been replaced by George Mitchell of Maine, a clean air advocate. On the Senate's Environment and Natural Resources Committee, three midwestern Senators have been replaced by three easterners, where the effects of acid deposition are more significantly felt (Senators Lieberman from Connecticut, Jeffords from Vermont, and Humphrey from New Hampshire). *Id.* William Reilly, the new Administrator of the EPA, formerly directed the Environmentalist Conservation Fund. *Id.* at 1882. On the House side, efforts to reauthorize to stricter ozone and carbon monoxide standards have foundered on the opposition of John Dingell, Chairman of the House Energy and Commerce Committee. *Id.* at 1883. Dingell's district includes the heart of the Detroit auto industry. *Id.* In 1989, however, Dingell announced his support for a strengthened clean air bill, possibly in recognition of its inevitability. See *Congress Urged to Break Stalemate Blocking Amendment of Clean Air Act*, 19 *Env't Rep.* (BNA) 2520 (Mar. 24, 1989).

<sup>92</sup> See ENVIRONMENTAL PROTECTION AGENCY, *INSIDE EPA WEEKLY REPORT* (June 16, 1989) [hereinafter *INSIDE EPA*].

<sup>93</sup> This is achieved by requiring an emission standard of 2.5 pounds sulfur dioxide per million BTUs by 1995, and 1.2 pounds by 2000. The baseline year for the 10 million ton reduction is 1980.

<sup>94</sup> The plan allows utilities to trade nitrogen oxide reductions for sulfur dioxide reductions at a ratio of 1.5:1.

<sup>95</sup> Starting in 1996, plants would be able to trade emissions reductions between states.

<sup>96</sup> Cooper, a Democrat from Tennessee, has introduced the Acid Rain Abatement Act of 1989, H.R. 144, 101st Cong., 1st Sess., 135 CONG. REC. H50 (1989). Under the first phase of this act, each state must obtain reductions to achieve a 3.5 million-ton, nationwide reduction in annual sulfur dioxide emissions before 1997. *Id.* § 181(b). Kerry, a Democrat from Massachusetts, has cosponsored with Senator Kennedy the National Acid Rain Control Act of 1989, S. 57, 101st Cong., 1st Sess., 135 CONG. REC. 5362 (daily ed. Jan. 25, 1989). This initiative seeks to reduce the sulfur dioxide emissions in the continental United States by 12 million tons by the year 2000. This goal is to be achieved partly through state plans for reductions in emission rates. *Id.* § 181(2).

might allocate the effort to reduce sulfur dioxide emissions more evenly.<sup>97</sup> Neither bill, however, establishes prescriptive or universally applicable standards nor dictates the choice of reduction technology. Although each state's plan must be submitted to the EPA for approval similar to state implementation plans under the Clean Air Act, it is left to the states to determine how to reduce the emissions.<sup>98</sup>

Given the difference between the sulfur contents in eastern and western coal, regional disparities are inevitable in efforts to reduce sulfur dioxide emissions. Since midwestern and eastern states will bear the brunt of reducing emissions,<sup>99</sup> a central issue is allocation of cost. The Bush proposal would provide no subsidies to utility consumers or affected workers.<sup>100</sup> Senator Kerry's bill would create an Acid Deposition Control Fund "to mitigate any potential economic impacts and coal mining job dislocation."<sup>101</sup> Taxing electricity generation within a state, this fund would pay owners and operators of facilities for capital expenditures incurred either in reducing sulfur dioxide emissions or in fuel-switching.<sup>102</sup>

Legislation proposed in 1987 by Representative Sikorski would compensate utilities in order to protect consumer utility rates.<sup>103</sup> A fee on electricity generation would be levied, varying in proportion to sulfur dioxide emissions. The monies generated would subsidize only those rate increases which are attributable to reducing sulfur dioxide emissions and which exceed by more than ten percent the

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<sup>97</sup> H.R. 144, § 181 (d)(1), 101st Cong., 1st Sess., 135 CONG. REC. H50 (1989). The allocation formula in Cooper's bill, for instance, divides the amount of each state's 1980 emission of sulfur dioxide in excess of 1.2 pounds per million BTUs by the 1980 total national emissions of sulfur dioxide in excess of 1.2 pounds per million BTU. *Id.*

<sup>98</sup> *Id.* § 182(c)(1). Cooper's bill also provides for intrastate emissions reduction trading. *See id.* § 183.

<sup>99</sup> Only 19 states' utilities are included in the plan, with Iowa being the western most state. *INSIDE EPA, supra* note 92, at 9.

<sup>100</sup> The EPA estimates the cost of the sulfur dioxide reductions to be \$700 million per year up to 1995, and \$160 billion per year until the year 2000. This will represent a 2% increase by the year 2000 in the nation's \$160 billion utility bill. *Id.* at 6.

<sup>101</sup> S. 57, § 181(3), 101st Cong., 1st Sess., 135 CONG. REC. 5362 (daily ed. Jan. 25, 1989).

<sup>102</sup> *Id.* § 196(c)(1)(A). The fee schedule applies to all owners or operators of fossil fuel fired electricity generating plants in each state. *Id.* The rate of the subsidy is \$147 per ton of sulfur dioxide emission reduction. *Id.* Payments are made for 15 years, beginning at the time the equipment starts operating. *Id.*

<sup>103</sup> Sikorski, a Democrat from Minnesota, introduced the Acid Deposition Control Act of 1987, H.R. 2666, 100th Cong., 1st Sess., 133 CONG. REC. H4558 (1987).

rates which would have been applicable without mandatory reductions.<sup>104</sup>

Since the Bush Administration's plan provides no funding mechanisms, West Virginia's Senator Byrd and others have predicted that utilities will switch to western coal rather than install scrubbers.<sup>105</sup> In addition, while this bill grants a moratorium until 2003 for the installation of clean coal technologies, utilities warn that this time period is insufficient.<sup>106</sup> Regardless of the final shape of President Bush's legislation,<sup>107</sup> the resolve to reduce sulfur dioxide emissions will increase the cost, decrease the acceptability and adversely affect the relative position of coal-burning as a means of generating electricity.

A number of states have seized the initiative on this issue in advance of federal action. Massachusetts, for instance, has set a statewide sulfur dioxide emissions cap at the average level of emissions from the period 1979-1982.<sup>108</sup> In addition, the state requires all fossil fuel generating facilities to meet emission rates of 1.2 pounds of sulfur dioxide per million BTUs.<sup>109</sup> The reductions achieved will reduce sulfur dioxide emissions by 68,000 to 87,000 tons annually, almost a twenty percent reduction from 1985 levels. Wisconsin also controls the sulfur dioxide emissions of fossil fuel

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<sup>104</sup> H.R. 1470, 101st Cong., 1st Sess. 135, CONG. REC. H709 (1989).

<sup>105</sup> INSIDE EPA, *supra* note 92, at 4.

<sup>106</sup> See ENVIRONMENTAL AND ENERGY STUDY CONFERENCE 3 (June 19, 1989) (remarks of Thomas Kuhn, Edison Electric Institute). The status of the clean coal program is very unclear. As recently as last year, the General Accounting Office asserted that clean coal technologies that will reduce sulfur dioxide emissions up to 99% would be commercially available by the year 2005. See *Tight Sulfur Dioxide Limits Before 2000 Would Threaten Clean Coal Program*, GAO Says, 19 Env't Rep. (BNA) 2625, 2626 (Apr. 21, 1989).

<sup>107</sup> The Administration's proposed sulfur dioxide reduction schedule closely resembles other proposed Clean Air Act legislation. The Bush proposal requires a 10 million ton reduction and an emission standard of 1.2 pounds sulfur dioxide per million BTUs by the year 2000. Representative Cooper's bill also requires 10 million ton reductions and 1.2 pound emission levels. See H.R. 144, 101st Cong., 1st Sess., 135 CONG. REC. H50 (1989). Senator Kerry's bill mandates 12 million tons and 1.0 pound emission levels. See S. 57, 101st Cong., 1st Sess., 135 CONG. REC. 5362 (daily ed. Jan. 25, 1989). Representative Sikorski's bill requires all states to meet emission levels of 1.2 pounds by 1997. See H.R. 2666, 100th Cong., 1st Sess., 133 CONG. REC. H4558 (1987). A bill introduced during the last Congress by Senator Mitchell of Maine had the tightest limits, requiring reductions of 12 million tons by the year 2000 and emission levels of 0.9 pounds by 1988. See S. 1894, 100th Cong., 1st Sess., 133 CONG. REC. 16,659 (1987).

<sup>108</sup> An Act Limiting Acid Rain and Acid Deposition, 1985 Mass. Acts 590.

<sup>109</sup> MASS. REGS. CODE tit. 310, § 7.22 (1989). Of the 168 facilities in Massachusetts covered by the legislation, 80% already comply with the emissions limit. MASSACHUSETTS DEP'T OF ENV'T QUALITY ENGINEERING RESPONSES TO WRITTEN AND ORAL TESTIMONY ON THE PROPOSED AMENDMENTS TO REGULATION, MASS. REGS. CODE tit. 310, § 7.22, Mar. 1989, at 1.

generators. By statute, Wisconsin must cap sulfur dioxide emissions at 65,000 tons annually by 1993,<sup>110</sup> and emission rates may not exceed 1.2 pounds of sulfur dioxide per million BTUs.<sup>111</sup> New Hampshire's Acid Rain Control Program sets a sulfur dioxide baseline of emissions from 1979-1982 and mandates a twenty-five percent reduction from those levels by 1991 and a fifty percent reduction by 1996.<sup>112</sup>

A number of states are conducting their own acid deposition research and monitoring, financing these activities by assessing emission fees on major utilities. In Wisconsin, the state appropriates up to \$400,000 annually.<sup>113</sup> In Minnesota, major utilities are required to fund sixty percent of the costs of both monitoring compliance with acid deposition control standards and researching on the impact of acid deposition.<sup>114</sup> California assesses up to \$1.5 million annually in sulfur and nitrogen oxide emission fees in order to fund acid deposition monitoring and research.<sup>115</sup> The logic of having the source of the acid deposition fund the research on its effects may well spread to other budget-conscious states.

### CONCLUSION

As Senator Rockefeller observed in March of this year, our national "[e]nergy policy has been . . . entirely and totally neglected for some 10 years now."<sup>116</sup> Fueled by fears of destroying the environment and concerns about international business, the pressure to formulate an effective energy policy for the 1990s has increased. Pending legislation at the federal level, and a variety of state initiatives already underway, reflect a growing consensus on the urgency of reducing the emissions associated with the generation of electricity. This Article has focused on two aspects of this consen-

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<sup>110</sup> WIS. STAT. § 144.388(2)(a)-(c) (1985). This figure includes: 325,000 tons from all major utilities and "large sources"; 250,000 tons from all fossil fueled boilers under the ownership and control of a utility; and 75,000 tons from all large sources. *Id.*

<sup>111</sup> *Id.* § 144.386(2)(a) (1985-86). The statute covers any plant which emitted over 5,000 tons of sulfur dioxide in any year after 1979 or any source which averaged emissions over 1,000 tons in the last five years. *Id.* §§ 144.386(1)(f), 144.388(1)(a).

<sup>112</sup> N.H. REV. STAT. ANN. § 125-D:3(I) (1986). The 50% reduction will not be implemented until Congress enacts federal acid deposition control requirements. *Id.* § 125-D:3(I)(d).

<sup>113</sup> WIS. STAT. § 196.856(1) (1987).

<sup>114</sup> MINN. STAT. § 116C.69(3) (1988).

<sup>115</sup> See 1988 Cal. Stat. 1518.

<sup>116</sup> See S. 324 Hearings, *supra* note 7, at 11 (statement of Senator John D. Rockefeller).

sus: the need to reduce and ultimately move toward elimination of carbon dioxide emissions to forestall global warming, and the need for sulfur dioxide reductions to stop the damage caused by acid rain. The former obviously implicates all fossil-fuel combustion; however, the burden of the latter falls disproportionately on coal-fired generation.

The ascendancy of these environmental concerns augurs a future in which the large, fossil-fuel fired electric generating plant, planned, constructed and owned by utility companies, the staple of the United States utility industry for decades, will be an endangered species. Nor is nuclear power a realistic possibility to fill the gap. The past decade has been disastrous for utilities building nuclear plants,<sup>117</sup> and they are unlikely to choose that option absent some fundamental change in the financial structure of the industry and in public opinion. Nonetheless, the surplus capacity that provided a cushion for the last fifteen years is being eroded.

If future load growth and the most cost-effective generating strategy are uncertain and dependent upon the success of both energy efficiency and demand-side management, then utilities will necessarily choose smaller plants with shorter construction lead time in order to retain their planning flexibility. This alternative would indicate that PURPA will continue to grow in importance since small increments of power are more easily met by independent power vendors than are large blocs. "By 1986, jurisdictions as diverse as California, Idaho, and Maine had indefinitely deferred all new coal and nuclear plants by signing up 1,424 wood-fired, hydro, wind, and cogeneration units with an average capacity of about 12 Megawatts."<sup>118</sup>

The utility industry is becoming increasingly competitive as growing numbers of small generators and energy efficiency suppli-

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<sup>117</sup> Forbes magazine characterized the United States' nuclear power program as "the largest managerial disaster in business history, a disaster on a monumental scale." Cook, *Nuclear Follies*, FORBES, Feb. 11, 1985, cover page. Cost overruns were staggering with plants originally projected to cost in the range of \$300 to \$400 million, topping out as high as five billion dollars and more. *Id.* at 84-88. The largest owner of the Seabrook plant, Public Service Company of New Hampshire, became the first public utility to go into bankruptcy since the depression. See Daniels, *Bankruptcy Filed by Leading Utility in Seabrook Plant*, N.Y. Times, Jan. 29, 1988, at A1, col. 6. The Washington Public Power Supply System, a consortium of municipal power systems that had planned to build five large nuclear plants, defaulted on \$2.25 billion worth of revenue, plunging it into years of litigation. See *When Billions in Bonds go Bust*, U.S. NEWS & WORLD REP., Aug. 8, 1983, at 7.

<sup>118</sup> See S. 324 Hearings, *supra* note 7, at 168 (testimony of Ralph Cavanagh, Natural Resources Defense Council).



ers offer their services in the marketplace.<sup>119</sup> This competition suggests that utilities will have to become more aggressive in moving into new areas of the energy business. For example, gas distribution companies have an opportunity to participate directly in cogeneration plants, particularly as coal becomes less attractive due to environmental restrictions. In addition, if least-cost planning is mandated by legislation, and energy efficiency providers are allowed to compete with supply sources at avoided cost, it seems likely that the explosive growth of cogeneration plants under PURPA will be replicated in the energy efficiency sector. When these changes occur, utilities no longer will be limited to the business of building and operating large electricity generating plants.

Under PURPA, utilities serve as the broker between customers and qualifying generators. In the energy efficiency market, however, utilities need not play the intermediary; they can provide the services themselves and gain a commission as well. Going beyond the home energy audits and efficiency rebates currently provided, utilities can purchase or produce energy efficiency products and sell them directly to consumers. The recent expansion into the market for full financial services by banks, which operate in another highly regulated industry, may provide a parallel to the development of utilities.

The resurgence of environmental sensitivity on a global scale, as typified by the global warming and acid rain issues, also provides an opportunity to reconcile economic and environmental policy. Both problems are worldwide and neither will be successfully addressed solely on the national level. In order to control carbon dioxide emissions, the developed world will have to present alternatives to fossil-fuel combustion for the developing nations, where the bulk of growth in coal-fired generation would otherwise occur.

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<sup>119</sup> *Id.* at 460 (statement of William Robertson, Pacific Power & Light Company). The vice president of Pacific Power and Light Company observed as follows:

In bulk power markets, we compete with other utilities, with non-utility generators and with oil and gas which is used to fire our customers' incremental generating capacity when the price is right. In retail markets, we compete with suppliers of on-site generation and cogeneration service who are targeting our largest industrial and commercial customers, with alternative fuel suppliers for residential and commercial space and water heating sales, and with suppliers of technology whose products tend to reduce sales of utility system energy. By our calculations, approximately 50 percent of our sales by volume are "at risk" in the short-to-intermediate term. And we believe the trend toward increased competition is accelerating.

*Id.*

This presents an opportunity to market, for example, solar and wind technologies internationally. The creation of such markets should also have the effect of bringing the cost of these technologies down for application in the United States.

In addition, loss of international competitiveness, once a strong argument invoked against emission control, is now a strong argument in favor of conservation and least-cost planning. Given the mounting trade deficit and concern over national competitiveness in global markets, the environmental community has wisely pressed economic arguments in its advocacy of a more environmentally benign energy policy. Energy-intensity analysis, least-cost planning, and the use of market forces through emissions reduction trading and PURPA qualifying facilities are all rationalized in economic as well as environmental terms.

Finally, the United States' first effort at guiding energy policy was not entirely unsuccessful. For example, automobiles are now far more fuel-efficient than they were in the early 1970s. However, the determination to develop alternative sources for generating electricity largely fell victim to plunging oil prices. One important distinction is that automobile efficiency standards were mandated by federal law, while alternative energy development was dependent on subsidies from the federal budget and hostage to international oil prices. To the extent that it is driven by environmental concerns, which have traditionally been resolved in a regulatory fashion by establishing emission limits or reduction targets, the United States' energy policy should be more lasting.

